CLAIMS

1. A continuous process for the production of chemically pure (S)-β-hydroxy-γ-butyrolactone having a desired optical activity, which comprises:

dissolving carboxylic acid ester derivative in solvent at an amount of 2-50 wt%, the solvent being added with an organic or inorganic acid;

hydrogenating the carboxylic acid ester derivative in the solvent at 50-500 °C under a pressure of 15-5,500 psig at weight-hourly-space-velocity of 0.1-10 h^{-1}, in a fixed bed reactor charged with a precious metal catalyst-impregnated inorganic oxide support, a molar ratio of hydrogen to carboxylic acid ester derivative ranging from 2 to 10; and

cyclizing a reaction intermediate such as methyl-di-hydroxy-butyric acid ester contained in the hydrogenated products in the presence of an acid catalyst

2. The process as defined in claim 1, wherein the precious metal catalyst is selected from the group consisting of nickel (Ni), palladium (Pd), platinum (Pt), rhodium (Rh), iridium (Ir), ruthenium (Ru), osmium (Os), and combinations thereof.

3. The process as defined in claim 1, wherein the precious metal catalyst is impregnated at an amount of 0.5-15 wt%.

4. The process as defined in claim 1 or 2, wherein the precious metal catalyst is ruthenium (Ru).

5. The process as defined in claim 1, wherein a degree of dispersion of the

precious metal in the catalyst is adjusted in the range of 2-25%, thereby a production efficiency per hour is increased.

6. The process as defined in claim 1, wherein the hydrogenation step is performed at 60-200 °C.

7. The process as defined in claim 1, wherein the hydrogenation step is performed under a pressure of 1,200-4,500 psig.

8. The process as defined in claim 1, wherein the hydrogenation step is carried out at weight-space-velocity of 0.2-6.0 h^{-1}.

9. The process as defined in claim 1, wherein the organic or inorganic acid additive in the solvent is added at an amount of 0.1-20 wt%, based on the solvent weight.

10. The process as defined in claim 1, wherein the solvent is selected from the group consisting of methyl alcohol, ethyl alcohol, n-propyl alcohol, isopropyl alcohol, dioxane, γ-butyrolactone, tetrahydrofuran, water, and combinations thereof.

11. The process as defined in claim 1 or 9, wherein the acid additive is selected from the group consisting of formic acid, oxalic acid, nitric acid, DL-malic acid, acetic acid, sulfuric acid, phosphoric acid, hydrochloric acid, and combinations thereof.

12. The process as defined in claim 1, wherein the inorganic oxide support is selected from the group consisting of alumina, silica, silica-alumina, zirconia, titania, zeolite and a molecular sieve.

13. The process as defined in claim 1, wherein the carboxylic acid ester derivative is obtained by reacting carboxylic acid with a linear, cyclic or aromatic alcohol having 1-10 carbon atoms in the presence of a solid acid catalyst, under conditions of a temperature of 50-150 °C, a pressure of 1.0-300 psig and weight-hourly-space-velocity of 0.1-10 h^{-1}, in which the alcohol is used at an amount of 2.0-40 equivalents based on the carboxylic acid.

14. The process as defined in claim 13, wherein said carboxylic acid is L-malic acid or L-citramalic acid.